

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

REC'D 19 DEC 2003

WIPO PCT

Applicant's or agent's file reference A3-161PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US03/09010	International filing date (day/month/year) 26.03.2003	Priority date (day/month/year) 26.03.2002
International Patent Classification (IPC) or both national classification and IPC H01R13/658		
Applicant MOLEX INCORPORATED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

I ☒ Basis of the opinion

II ☐ Priority

III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability



IV ☐ Lack of unity of invention

V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☐ Certain defects in the international application

VIII ☐ Certain observations on the international application

Date of submission of the demand 23.10.2003	Date of completion of this report 17.12.2003
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Langbroek, A Telephone No. +49 89 2399-2544 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US03/09010**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-13 as originally filed

Claims, Numbers

1-13 filed with telefax on 23.10.2003

Drawings, Sheets

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US03/09010**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	1-13
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US03/09010

The documents are numbered in the following way:

D1: US-A-5632634,

D2: EP-A-0971451.

1. Claim 13 is not clear (art. 6 PCT), because of the wordings "by **the** grounding shell upper plate", "to **the** grounding shell lower plate" and "by **the** conductive connection bridges" (bridging pages 16 and 17), since the grounding shell upper and lower plate and the conductive connection bridges have not been defined before, at least not in claim 13.

This though has well been defined in claim 1, defining:

F1: "said housing including a plurality of mating openings formed along the mating face thereof, each of the mating openings communicating with a single terminal of said connector, the grounding shell including a plurality of openings formed by connective bridges that extend between an upper plate and a lower plate of the grounding shell and that perform the coupling of the upper and lower plate, the plurality of openings formed thereby corresponding to and aligned with said housing mating openings".

Feature F1 is considered to be essential for claim 13 and should have been defined in therein (Art. 6 PCT).

2. This International Preliminary Examination Report (IPER) has been written presuming claim 13 contains feature F1.

- 3 The **closest prior art** for claim 13 (as interpreted in § 2 here above) is a:

"method of manufacturing a high-speed (see the title: "high frequency") cable connector (the method is implicitly disclosed with the connector 202 of figure 11), the method comprising the steps of:
exposing lead wires (222,224) of a cable (216) by removing exterior insulation (218,220) of the cable;

attaching the cable lead wires to conductive terminals (206);
locating the terminals in an insulative housing (204,208) having a lower body portion (204) and an upper body portion (208), which define the connector housing, and,
enclosing the connector housing in a grounding shell (210) that extends around the connector housing so that the grounding shell substantially covers the opposing upper and lower body portions and substantially surrounds and shields the conductive terminals,
electric signals on a signal terminal in the housing body portions are shielded by the grounding shell upper plate that is electrically and mechanically coupled to the grounding shell lower plate,
said housing including a plurality of mating openings formed along the mating face thereof, each of the mating openings communicating with a single terminal of said connector"

from which the subject-matter of claim 13, as interpreted in § 2, differs in that:

F2: "the cable is fixed to a cable holder" and

F3: "the grounding shell including a plurality of openings formed by connective bridges that extend between an upper plate and a lower plate of the grounding shell and that perform the coupling of the upper and lower plate, the plurality of openings formed thereby corresponding to and aligned with said housing mating openings"

4. Claim 13 is considered to be not obvious, see especially features F2 and F3.

Concerning feature F2: The only part which could be interpreted as a "holder" in the known prior art is the PCB (36) of D2. Claim 13 of the application though defines the wires to be attached to the terminals, which would not be the case with a combination of D1 and D2, D2 disclosing the wires being attached to the PCB and the PCB to the terminals.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US03/09010

Concerning feature F3: This feature has not been disclosed, nor indicated by the prior art and improves the shielding.

5. The subject-matter of claim 1 is not obvious for the same reasons and the other claims are dependent claims, all of the claims therefore complying with the requirements of Article 33(2) and (3) PCT.
6. The invention according to the claims is industrially applicable, the claims therefore complying with Article 33(4) PCT.

What Is Claimed Is:

1. A high-speed connector for connecting at least one cable to a mating connector, the cable having a plurality of signal conductors and at least one grounding conductors therein, comprising:
 - a holder for holding a free end of the cable in a preselected position;
 - a plurality of conductive signal terminals and one ground terminal, each signal and ground terminal including a termination end and a contact end disposed at opposite ends of the terminal for terminating to said cable signal and ground conductors;
 - an insulative housing formed from interengaging upper and lower body portions, the housing having a mating face for mating with the mating connector and a cable face for engaging said cable, the upper and lower body portions cooperatively holding the cable holder and said terminal in place within the housing, the upper body portion having an upper grounding hole extending through said upper body portion, the lower body portion including a lower grounding hole extending through the lower body portion;
 - said housing further including a plurality of mating openings formed along the mating face thereof, the mating openings, each of the mating openings communicating with a single terminal of said connector; and,
 - a grounding shell disposed on both of the upper and lower surfaces of said housing and including a plurality of openings formed therein corresponding to and aligned with said housing mating openings, said grounding shell further including grounding arms that contact said grounding terminal within said housing, thereby providing grounding to said connector.
2. A connector as claimed in claim 1, wherein said housing lower body portion includes a plurality of partitions disposed thereon and extending longitudinally within said housing to define a plurality of terminal-receiving spaces, said terminals being disposed in the terminal-receiving spaces between the partitions.
3. A connector as claimed in claim 1, wherein said housing upper body and the lower body portions are joined to each other by ultrasonic welding.

4. A connector as claimed in claim 1, wherein said housing upper and lower body portions include a plurality of assembly holes, and said cable holder includes a plurality of assembly posts projecting therefrom, the assembly posts being received within said assembly holes, thereby fixing said cable holder in said housing.
5. A connector as claimed in claim 1, wherein said cable wires are joined to said terminal termination portions by spot-welding.
6. A connector as claimed in claim 1, wherein said grounding shell includes an upper grounding plate with an upper grounding arm that extends through said housing upper grounding hole into contact with said grounding terminal, and a lower grounding plate with a lower grounding arm that extends through said housing lower body portion into contact with said grounding terminal; and,
A plurality of connection bridges connecting front ends of the upper and lower grounding plates together and further defining mating openings which correspond to and are aligned with said housing mating openings.
7. A connector as claimed in claim 6, wherein said upper and lower grounding arms contact said grounding terminal from opposite sides thereof to define a three layer grounding connection.
8. A connector as claimed in claim 6, wherein said upper and lower grounding plates each have a length that extends between said housing mating face and said cable holder.
9. A connector as claimed in claim 8, wherein said upper and lower grounding plates have equal lengths.
10. A connector as claimed in claim 6, wherein said upper and lower grounding arms are formed in respective center portions of said grounding shell upper and lower grounding plates.

11. A connector as claimed in claim 6, wherein at least one of said grounding shell upper and lower grounding plates include a flexible contact arm formed thereon and oriented transversely thereto for contacting a transverse portion of said mating connector.
12. A connector as claimed in claim 6, wherein each of said grounding shell upper and lower grounding plates includes a flexible contact arm formed thereon and oriented transversely thereto for contacting a transverse portion of said mating connector.
13. A method of manufacturing a high-speed cable connector, the method comprising the steps of:
 - exposing lead wires of a cable by removing exterior insulation of the cable and fixing said the cable to a cable holder;
 - welding the cable lead wires to termination portions of a plurality of conductive terminals;
 - locating the terminals in an insulative housing base and assembling a cover onto the housing base to define a connector housing; and,
 - assembling a grounding shell onto exterior surfaces of said housing so that the grounding shell covers opposing upper and lower surfaces of said housing.

AMENDED CLAIMS

[received by the International Bureau on 11 August 2003 (11.08.2003)
original claims 1-13 replaced by amended claims 1-13]

- 2 .A connector as claimed in claim 1, wherein said housing lower body portion (250) includes a plurality of sidewalls (258) disposed thereon and extending longitudinally within said lower body portion (250) to define a plurality of terminal-receiving partitions (262), said terminals (112, 114) being disposed in the terminal-receiving partitions (262).
- 3 .A connector as claimed in claim 1, wherein said housing upper (210) body and the lower (250) body portions are joined to each other by ultrasonic welding.
4. A connector as claimed in claim 1, wherein said housing upper (210) and lower (250) body portions include a plurality of assembly holes (214), and said cable holder (100) includes a plurality of assembly posts (102) projecting therefrom, the assembly posts (102) being received within said assembly holes (214), thereby fixing said cable holder (100) in said housing.
5. A connector as claimed in claim 1, wherein said cable (12) has a plurality of cable wires (14) are joined to said terminals (112, 114).
- 6 .A connector as claimed in claim 1, wherein said grounding shell includes an upper grounding plate (310) with an upper grounding arm (312) that extends through said housing upper grounding hole (212) into contact with said grounding terminal (114), and a lower grounding plate (320) with a lower grounding arm (322) that extends through said housing lower body portion (250) into contact with said grounding terminal (114);
and,
a plurality of connection bridges (330) connecting the front ends of the upper (310) and lower (320) grounding plates together and further defining mating openings which correspond to and are aligned with said housing mating openings (262).
- 7 .A connector as claimed in claim 6, wherein said upper (312) and lower (322) grounding arms contact said grounding terminal (114) from opposite sides thereof to define a three layer grounding connection.
8. A connector as claimed in claim 6, wherein said upper (310) and lower (320) grounding

plates each have a length that extends between said housing mating face and said cable holder (100).

9. A connector as claimed in claim 8, wherein said upper (310) and lower (320) grounding plates have equal lengths.
10. A connector as claimed in claim 6, wherein said upper (312) and lower (322) grounding arms are formed in respective center portions of said grounding shell upper (310) and lower (320) grounding plates.
11. A connector as claimed in claim 6, wherein at least one of said grounding shell upper (310) and lower (320) grounding plates include an elastic flap (315) formed thereon and oriented transversely thereto for contacting a transverse portion of said mating connector.
12. A connector as claimed in claim 6, wherein each of said grounding shell upper (310) and lower (320) grounding plates includes an elastic flap (316) formed thereon and oriented transversely thereto for contacting a transverse portion of said mating connector.
13. A method of manufacturing a high-speed cable connector, the method comprising the steps of:
 - exposing lead wires (14) of a cable (12) by removing exterior insulation of the cable (12) and fixing the cable to a cable holder (100);
 - attaching the cable lead wires (14) to conductive terminals (112, 114);
 - locating the terminals in an insulative housing having a lower body portion (250) and an upper body portion (210), which define a connector housing; and,
 - enclosing the connector housing in a grounding shell (310, 320, 330) that extends around the connector housing so that the grounding shell (310, 320, 330) substantially covers opposing upper (210) and lower body portions and substantially surrounds and shields the conductive terminals (112, 114), the method characterized in that:
 - electrical signals on a signal terminal (112) in the housing body portions (210, 250) are shielded by the grounding shell upper plate (310) that is electrically and mechanically coupled to the grounding shell lower plate (320) by the conductive

connection bridges (330).